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09/830235

INTERNATIONAL APPLICATION NO.
PCT/US99/25253INTERNATIONAL FILING DATE
03 November 1999 (03.11.99)PRIORITY DATE CLAIMED
03 November 1998 (03.11.98)

TITLE OF INVENTION

METHOD AND APPARATUS FOR UPDATING COMPUTER CODE USING AN
INTEGRATED CIRCUIT INTERFACE

APPLICANT(S) FOR DO/EO/US

Aaron Hal Dinwiddie, Kevin Eugene Nortrup, Derek Liu, Yefim Vayl

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c)(2))
- a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
- b. ☐ has been transmitted by the International Bureau.
- c. ☒ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210). attached to Item 13
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
- a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
- b. ☐ have been transmitted by the International Bureau.
- c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
- d. ☒ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98. with references attached
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail 20. Return postcard receipt

20. ☒ Other documents or information:

CERTIFICATE OF MAILING UNDER 37 CFR 1.10

EL682442074US

April 24, 2001

"Express Mail" mailing no.

Date of Deposit

I hereby certify that this application is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

DAVIDA FORNAROTTO

Typed or printed name of person
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application

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Aaron Hal Dinwiddie, Kevin Eugene Nortrup, Derek Liu,
Yefim Vayl

Filed : Herewith

For : METHOD AND APPARATUS FOR UPDATING
COMPUTER CODE USING AN INTEGRATED CIRCUIT
INTERFACE

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Sir:

In the US national phase application of PCT/US99/25253 filed
herewith, please enter the following amendments:

IN THE SPECIFICATION:

Please amend the specification as follows. A marked up version of the
amended specification is attached herewith:

Page 1, lines 1-2, delete "METHOD AND APPARATUS FOR
UPDATING COMPUTER CODE USING A INTEGRATED CIRCUIT
INTERFACE" and insert -- METHOD AND APPARATUS FOR UPDATING
COMPUTER CODE USING AN INTEGRATED CIRCUIT INTERFACE --

On Page 1 amend the first paragraph as follows:

-- This application claims the benefit of U.S. provisional application
serial no. 60/106,809 filed November 3, 1998, which is hereby incorporated herein by
reference, and which claims the benefit under 35 U.S.C. § 365 of International
Application PCT/US99/25253, filed November 3, 1999, which was published in
accordance with PCT Article 21(2) on May 11, 2000 in English.--

IN THE CLAIMS:

Please amend the claims (which are the annexes of the International Preliminary Examination Report) as follows. A marked up version of the amended claims is attached herewith.

1. An apparatus for loading computer code comprising:
 - a card interface capable of distinguishing between a conventional integrated circuit card and a memory card;
 - a memory card comprising a memory unit and a memory unit controller; and
 - a computer controlled device memory unit for storing a first computer code that is downloaded from the memory unit of the memory card.
2. The apparatus of claim 1 wherein a second computer code stored in the computer controlled device memory unit is updated by the first computer code stored in the memory unit of the memory card.
3. The apparatus of claim 1 wherein said memory card comprises at least one high speed data port.
4. The apparatus of claim 3 wherein the at least one high speed data port is used to transmit the first computer code from the memory card memory unit to the computer controlled device memory unit.

5. The apparatus of claim 1 wherein said card interface comprises:
- means for producing a first signal that is coupled to an integrated circuit card connection; and
- means for analyzing a second signal that is produced by a memory card in response to said first signal.
6. The apparatus of claim 5 wherein said second signal is not produced by integrated circuit cards that are not memory cards.
7. The apparatus of claim 5 wherein said card interface applies said first signal to a clock signal connector of said integrated circuit card connection and receives said second signal on a data input/output signal connector of said integrated circuit card connection.
8. The apparatus of claim 1 wherein said card interface further comprises at least one high speed data path with said memory card.
9. The apparatus of claim 1 wherein said card interface further comprises :
- means for transferring computer code from said memory card to said computer controlled device memory unit.
10. The apparatus of claim 1 wherein said card interface further comprises:
- means for accepting or rejecting the computer code for transference from said memory card to said computer controlled device memory unit.

11. A method of loading computer code in a computer controlled device comprising the steps of:

identifying whether an integrated circuit card is a memory card or a conventional integrated circuit card; and,

transferring the computer code through a high speed data port of a memory card into said computer controlled device.

12. The method of claim 11 wherein said identifying step further comprises the steps of:

applying a first signal to said memory card; and

analyzing a second signal produced by said memory card in response to said first signal to determine if said integrated circuit card is a memory card.

13. The method of claim 12 wherein said transferring step further comprises:

activating an NRSS interface.

IN THE ABSTRACT:

Please add the following Abstract.

-- A method and apparatus for providing computer code updates through an integrated circuit card (smart card) interface. The smart card interface within a computer control device determines whether the card that is inserted into the smart card interface is either a memory card or a conventional smart card. Once the smart card interface has detected that the memory card has been inserted, the interface requests data from the card. The interface provides the computer code to the memory of the computer controlled device to update the computer code therein.--

REMARKS

The title has been amended to conform with the translated title of the published application (WO 00/26767).

The specification has been amended to include a reference to the priority applications.

The claims have been amended to remove reference indicia.

To meet the requirements of the United States, the Abstract (as originally filed in the PCT application) is added.

No fee is believed to have been incurred by virtue of this amendment. However if a fee is incurred on the basis of this amendment, please charge such fee against deposit account 07-0832

Respectfully submitted,
Aaron Hal Dinwiddie
Kevin Eugene Nortrup
Derek Liu
Yefim Vayl



David T. Shoneman
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609/734-9875

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Patent Operation
PO Box 5312
Princeton, NJ 08543-5312

April 24, 2001

MARKED UP VERSION OF THE AMENDED SPECIFICATION

Please amend the specification as follows. A marked up version of the amended specification is attached herewith:

Page 1, lines 1-2, delete "METHOD AND APPARATUS FOR UPDATING COMPUTER CODE USING A INTEGRATED CIRCUIT INTERFACE" and insert -- METHOD AND APPARATUS FOR UPDATING COMPUTER CODE USING AN INTEGRATED CIRCUIT INTERFACE --

On Page 1 amend the first paragraph as follows:

-- This application claims the benefit of U.S. provisional application serial no. 60/106,809 filed November 3, 1998, which is hereby incorporated herein by reference, and which claims the benefit under 35 U.S.C. § 365 of International Application PCT/US99/25253, filed November 3, 1999, which was published in accordance with PCT Article 21(2) on May 11, 2000 in English.--

MARKED UP VERSION OF THE AMENDED CLAIMS

Please amend the claims (which are the annexes of the International Preliminary Examination Report) as follows. A marked up version of the amended claims is attached herewith.

1.(AMENDED) An apparatus [(100)] for loading computer code comprising:

a card interface [(120)] capable of distinguishing between a conventional integrated circuit card and a memory card [(104)];

a memory card [(104)] comprising a memory unit [(114)] and a memory unit controller [(116)]; and

a computer controlled device memory unit [(110)] for storing a first computer code [(124)] that is downloaded from the memory unit [(114)] of the memory card [(104)].

2.(AMENDED) The apparatus of claim 1 wherein a second computer code [(122)] stored in the computer controlled device memory unit is updated by the first computer code [(124)] stored in the memory unit [(114)] of the memory card [(104)].

3.(AMENDED) The apparatus of claim 1 wherein said memory card [(104)] comprises at least one high speed data port [(128)].

4.(AMENDED) The apparatus of claim 3 wherein the at least one high speed data port [(128)] is used to transmit the first computer code [(124)] from the memory card memory unit [(114)] to the computer controlled device memory unit [(110)].

5.(AMENDED) The apparatus of claim 1 wherein said card interface comprises:

means for producing a first signal [(208)] that is coupled to an integrated circuit card connection [(118)]; and

means for analyzing a second signal that is produced by a memory card in response to said first signal [(210)].

6. The apparatus of claim 5 wherein said second signal is not produced by integrated circuit cards that are not memory cards.

7.(AMENDED) The apparatus of claim 5 wherein said card interface [(120)] applies said first signal to a clock signal connector of said integrated circuit card connection [(118)] and receives said second signal on a data input/output signal connector of said integrated circuit card connection [(118)].

8.(AMENDED) The apparatus of claim 1 wherein said card interface [(120)] further comprises at least one high speed data path [(128)] with said memory card [(104)].

9.(AMENDED) The apparatus of claim 1 wherein said card interface [(120)] further comprises :

means for transferring computer code from said memory card to said computer controlled device memory unit [(108)].

10.(AMENDED) The apparatus of claim 1 wherein said card interface [(120)] further comprises:

means for accepting or rejecting the computer code for transference from said memory card to said computer controlled device memory unit [(218)].

11.(AMENDED) A method of loading computer code in a computer controlled device comprising the steps of:

identifying whether an integrated circuit card is a memory card or a conventional integrated circuit card [(212)]; and,

transferring the computer code through a high speed data port of a memory card into said computer controlled device [(222)].

12.(AMENDED) The method of claim 11 wherein said identifying step further comprises the steps of:

applying a first signal to said memory card [(208)]; and

analyzing a second signal produced by said memory card in response to said first signal to determine if said integrated circuit card is a memory card [(210)].

13.(AMENDED) The method of claim 12 wherein said transferring step further comprises:

activating an NRSS interface [(216)].

**METHOD AND APPARATUS FOR UPDATING COMPUTER CODE USING A
INTEGRATED CIRCUIT INTERFACE**

This application claims the benefit of U.S. provisional application serial no. 60/106,809, filed November 3, 1998, which is hereby incorporated herein by reference.

BACKGROUND OF THE DISCLOSURE

1. Field of the Invention

The present invention relates to techniques for updating computer code in computer controlled devices and, more particularly, the invention relates to a method and apparatus for updating computer code in computer controlled devices utilizing an integrated circuit card (smart card) interface.

2. Description of the Background Art

Many consumer electronics devices such as pay TV systems, set top cable television boxes, terrestrial television receivers, satellite television receivers and the like, require periodic software updates to provide signal processing, interactive features, and security improvements to the consumer. Software upgrades for such devices are generally performed by replacing the read only memory chips within the device or connecting a computer to a data port on the device to download the software upgrade into the memory of the device. Such upgrades require a technician to visit the consumer's location and perform the upgrade of the software. Alternatively, the consumer must return the device to the manufacturer, then be provided a replacement device that contains the upgraded software. Such a software upgrade process is time consuming and costly.

Therefore, a need exists in the art for an improved technique for upgrading computer code within a computer controlled device.

SUMMARY OF THE INVENTION

The disadvantages associated with the prior art are overcome by the invention of a method and apparatus for providing computer code through a smart card interface. The invention utilizes a memory card, i.e., a smart card containing a solid state memory device, that stores software that is used to update (or otherwise supplement) the software within a computer controlled device.

In accordance with one aspect of the present invention, the smart card interface within the computer controlled device determines whether the card that is inserted into the smart card interface is either a memory card or a conventional smart card. A memory card has a connector arrangement that complies with ISO standard 7816-2 and high speed data ports of an NRSS-type card such that the software update can be performed through the smart card interface. Once the smart card interface has detected that a memory card has been inserted, the interface requests data from the card. Specifically, the interface provides an NRSS-type clock signal to the memory card causing the NRSS data port to supply the computer code update from the memory card at the rate of about 42 Mbits/second. The smart card interface reads the data stream header within the data being supplied by the memory card such that the interface makes a decision to accept the computer code data or reject that data. The header information also supplies the interface with operation termination conditions e.g., end of file information. The interface provides the computer code to the memory of the computer controlled device to update the computer code therein.

The technique of the present invention can be widely used in any type of firmware updateable embedded system. It is very convenient for a service person to update the product software in the field as well as for the customer to update the product software themselves.

BRIEF DESCRIPTION OF THE DRAWINGS

The teachings of the present invention can be readily understood by considering the following detailed description in conjunction with the accompanying drawings, in which:

FIG. 1 depicts a block diagram of a software updating system including a smart card interface that operates in accordance with the present invention;

FIG. 2 depicts a flow diagram showing the operation of the present invention.

To facilitate understanding, identical reference numerals have been used, where possible, to designate identical elements that are common to the figures.

DETAILED DESCRIPTION

The method and apparatus of the present invention are applicable in performing computer code updates within any computer controlled device having an integrated circuit card interface (commonly known as a smart card interface). Such computer controlled devices are in broad use in consumer electronics components such as direct broadcast satellite television systems, set top boxes for cable and video-on-demand systems, high definition television systems, and the like.

Figure 1 depicts a software updating system 100 comprising a computer controlled device 102 having a smart card interface 120 and a memory card 104. The computer controlled device 102 comprises a microcontroller 108, a computer controlled system 106 (for example, the video processing functions of a television), and a memory 110 wherein the computer code 122 to be updated is stored. The computer controlled device 102 further contains a card reader 112 for a smart card and a connector 118 that forms the smart card interface 120 to a smart card 104. The smart card interface 120 can read either conventional smart cards which comply with the ISO standard 7816 smart card format or an NRSS type smart card, i.e., a 7816 compliant card having two high

speed data ports. In the current embodiment of the invention, the NRSS smart card contains a memory unit 114 and a memory controller 116 which together form the memory card 104.

The connector 118 comprises eight conductive paths for activating and
5 accessing the card 104. These paths include six paths 126 that comply with ISO standard 7816-2, namely: supply voltage, reset signal, clock signal, ground, programming voltage, data input/output. In addition, the card 104 includes two paths 128 for a high-speed data input and a high-speed data output. Other
10 embodiments of the invention may supply the software through the conventional 7816 I/O port, or through a completely different pin and port arrangement. A detailed description of a smart card interface for accessing a smart card having a conventional ISO standard 7816-2 connector with high speed data input and
15 output capabilities is described in United States Patent 5,852,290, issued December 22, 1998 (filed August 4, 1995), entitled "Smart-Card Based Access Control System With Improved Security", and incorporated herein by reference in its entirety.

After the memory card 104 is inserted into the smart card interface 120,
the interface 120 determines whether the smart card is a conventional smart
card or a memory card 104 containing the computer code update 124. After
20 recognizing a memory card 104 has been inserted, the microcontroller 108 activates an NRSS interface (as opposed to a conventional ISO standard 7816 interface) to utilize the high speed data ports and extracts the data (the executable computer code 124) from the memory card at about 42
Mbits/second. The computer code 124 is channeled to the memory 110 and
25 used to update the contents of the memory 110. In this manner, 3.5 Mbits code size can be updated in the computer controlled device 102 in less than two minutes. The term "update" is meant to include downloading "patch" software that supplements existing software stored in the memory 110 as well as
downloading entirely new software to the memory 110.

30 FIG. 2 depicts a flow diagram of the process 200 used to update the computer code of a computer controlled device. The computer code update

process 200 is performed in two stages. The first stage 202 identifies a memory card as opposed to other types of smart cards and the second stage 204 loads the data from the memory card into the memory of the microcontroller.

5 In the memory card identification stage 202, the microcontroller, at step 206, places the inserted card in ISO/7816 reset state, i.e., the interface toggles the reset signal path. In the reset state, a conventional smart card is in sleep mode, and will not respond to an external signal. As such, any signal applied to any of the pins of the smart card would be ignored by a conventional 7816
10 smart card. In contrast, a memory card, although in sleep mode, monitors the clock input path, e.g. a SC_CLK input terminal. At step 208, the microcontroller applies a pulse signal to the smart card's SC_CLK terminal. The pulse signal, for example, transitions to high from low and back to high again. In response, the data input/output path of a memory card produces an opposite state signal. At
15 step 210, the microcontroller monitors the data input/output path of the interface connection for a responsive signal. As such, the microcontroller will consider, at step 212, the inserted card as a memory card if the data input/output signal transitions from low to high and then to low, i.e., the data input output signal is opposite the applied clock signal. Otherwise, the routine 200 proceeds to step
20 214 and stops. After card identification stage is complete 202, the system starts to request data from the card in stage 204.

In the data requesting stage 204, the controller, at step 216, utilizes the NRSS interface, i.e., using NRSS_CLK and NRSS_DATA control input, to extract data, i.e., the new updated executable code, from the memory card at a about
25 42 MB/second rate. The data stream header is analyzed at step 218. According to the data stream header, the microcontroller will make a decision to accept the code data or reject it, as well as obtain operation termination conditions, i.e., obtain an end-of-file identifier. If the data is rejected, the routine 200 proceeds to step 220. If the data is accepted, at step 222, the data is sent to the
30 memory within the computer controlled device for storage. The routine stops, at

step 224, when a termination condition is met, i.e., an error occurs or a data file end-of-file code is reached.

The inventive technique can be widely used on any type of firmware updateable imbedded systems such as set top boxes, consumer electronics equipment and the like. It is very convenient for the service person to update the product software in the field, as well as for the customer to update the product software themselves.

Although one embodiment which incorporates the teachings of the present invention has been shown and described in detail herein, those skilled in the art can readily devise many other varied embodiments that still incorporate these teachings.

7
CLAIMS

ART 34 AMDT

1. An apparatus (100) for loading computer code comprising:
a card interface (120) capable of distinguishing between a conventional integrated circuit
5 card and a memory card (104);
a memory card (104) comprising a memory unit (114) and a memory unit controller
(116); and
a computer controlled device memory unit (110) for storing a first computer code (124)
that is downloaded from the memory unit (114) of the memory card (104).
- 10 2. The apparatus of claim 1 wherein a second computer code (122) stored in the computer
controlled device memory unit is updated by the first computer code (124) stored in the memory
unit (114) of the memory card (104).
3. The apparatus of claim 1 wherein said memory card (104) comprises at least one high
speed data port (128).
- 15 4. The apparatus of claim 3 wherein the at least one high speed data port (128) is used to
transmit the first computer code (124) from the memory card memory unit (114) to the computer
controlled device memory unit (110).
5. The apparatus of claim 1 wherein said card interface comprises:
means for producing a first signal (208) that is coupled to an integrated circuit card
20 connection (118); and
means for analyzing a second signal that is produced by a memory card in response to
said first signal (210).

6. The apparatus of claim 5 wherein said second signal is not produced by integrated circuit cards that are not memory cards.

5 7. The apparatus of claim 5 wherein said card interface (120) applies said first signal to a clock signal connector of said integrated circuit card connection (118) and receives said second signal on a data input/output signal connector of said integrated circuit card connection (118).

8. The apparatus of claim 1 wherein said card interface (120) further comprises at least one high speed data path (128) with said memory card (104).

10 9. The apparatus of claim 1 wherein said card interface (120) further comprises :
means for transferring computer code from said memory card to said computer controlled device memory unit (108).

10. The apparatus of claim 1 wherein said card interface (120) further comprises:
means for accepting or rejecting the computer code for transference from said memory

15 card to said computer controlled device memory unit (218).

11. A method of loading computer code in a computer controlled device comprising the steps of:

identifying whether an integrated circuit card is a memory card or a conventional integrated circuit card (212); and,

20 transferring the computer code through a high speed data port of a memory card into said computer controlled device (222).

12. The method of claim 11 wherein said identifying step further comprises the steps of:

applying a first signal to said memory card (208); and

analyzing a second signal produced by said memory card in response to said first signal

25 to determine if said integrated circuit card is a memory card (210).

13. The method of claim 12 wherein said transferring step further comprises:

activating an NRSS interface (216).

14. The method of claim 11 further comprises:

analyzing a header of said computer code to determine the validity of the computer code

(218).

5 15. The method of claim 11, further comprising toggling a reset signal.

16. The method of claim 15, further comprising said memory card monitoring a clock input terminal for said first signal in response to said toggled reset signal.

17. The method of claim 16, wherein said memory card generates said second signal in response to detection of said first signal.

10 18. An apparatus (100) for updating computer code for controlling a computer controlled device, said apparatus comprising:

a card interface (120) capable of distinguishing between a conventional integrated circuit card and a memory card (104);

a memory card (104) comprising a memory unit (114) and a memory unit controller

15 (116); and

a computer controlled device memory unit (110) for storing a first computer code (124) that is downloaded from the memory unit (114) of the memory card (104);

wherein said computer controlled device is programmed by said first computer code (124) that is downloaded from the memory unit (114) of the memory card (104).

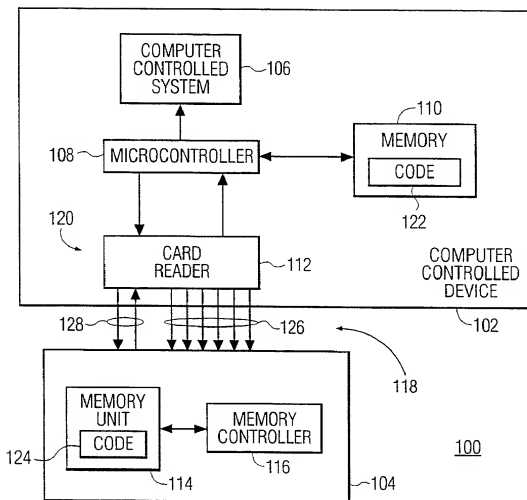


FIG. 1

2/2

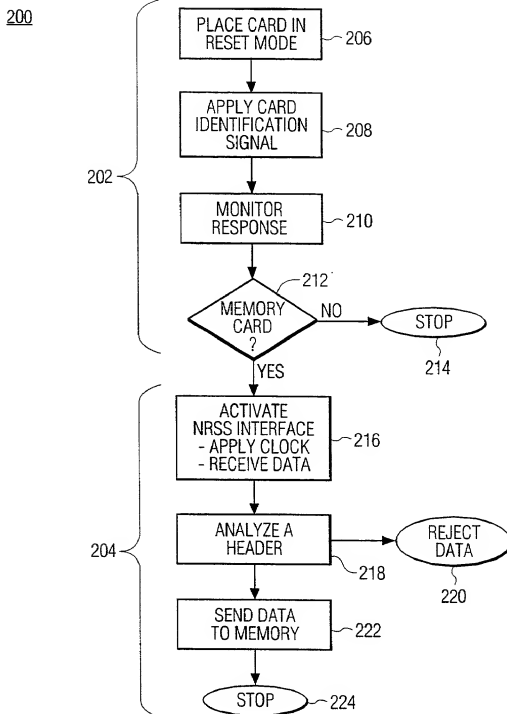


FIG. 2

Please type a plus sign (+) inside this box → ☐

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Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63) <input type="checkbox"/> Declaration Submitted with Initial Filing OR <input checked="" type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16(e)))	Attorney Docket Number RCA 89210	
	First Named Inventor Aaron Hal Dinwiddie et al.	
	COMPLETE IF KNOWN	
	Application Number /	
	Filing Date	
Group Art Unit		
Examiner Name		

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

METHOD AND APPARATUS FOR UPDATING COMPUTER CODE USING AN INTEGRATED CIRCUIT INTERFACE

the specification of which (Title of the Invention)

☐ is attached hereto

OR

☒ was filed on

November 3, 1999

as United States Application Number or PCT International

Application Number **PCT/US99/25253** and was amended on (MM/DD/YYYY) **December 21, 2000** (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above:

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign	Foreign Filing Date	Priority	Certified Copy Attached?
		YES	NO
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	
60/106,809	November 3, 1998	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

Burden Hour Statement: This form is estimated to take 21 minutes to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

DECLARATION — Utility or Design Patent Application

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Name Mr. Joseph S. Tripoli - Patent OperationsAddress THOMSON multimedia Licensing Inc.Address PO Box 5312City PrincetonState NJZIP 08540Country USTelephone 609-734-9875Fax 609-734-9700

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR :☐ A petition has been filed for this unsigned inventorGiven Name
(first and middle (if any)) AARON HALFamily Name
or Surname DINWIDDIEInventor's
Signature Aaron Hal DinwiddieDate 4/9/01Residence: City CICEROState INCountry USCitizenship US

Mailing Address

Mailing Address 1075 Bear Cub DriveCity CiceroState INZIP 46034Country US**NAME OF SECOND INVENTOR:**☐ A petition has been filed for this unsigned inventorGiven Name
(first and middle (if any)) KEVIN EUGENEFamily Name
or Surname NORTRUPInventor's
Signature Kevin Eugene NortrupDate 4/19/01Residence: City FAIRLANDState INCountry USCitizenship US

Mailing Address

Mailing Address 7477 North London RoadCity FairlandState INZIP 46126-9669Country US☒ Additional inventors are being named on 1 supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.

Please type a plus sign (+) inside this box → +

PTO/SB/02A (11-00)

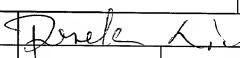
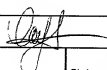
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DECLARATION

ADDITIONAL INVENTOR(S)
Supplemental Sheet
Page 3 of 3

Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
<u>DEREK</u>		<u>LIU</u>	
Inventor's Signature			Date <u>4/11/2004</u>
Residence: City	<u>CARMEL</u>	State <u>IN</u>	Country <u>US</u> Citizenship <u>CN</u>
Mailing Address			
Mailing Address <u>12523 Pebble Knoll Way</u>			
City	<u>Carmel</u>	State <u>IN</u>	ZIP <u>46033</u> Country <u>US</u>
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
<u>YEFIM</u>		<u>VAYL</u>	
Inventor's Signature			Date <u>4.9.01</u>
Residence: City	<u>CARMEL</u>	State <u>IN</u>	Country <u>US</u> Citizenship <u>US</u>
Mailing Address			
Mailing Address <u>14360 Witworth Drive</u>			
City	<u>Carmel</u>	State <u>IN</u>	ZIP <u>46033-8610</u> Country <u>US</u>
Name of Additional Joint Inventor, if any:		<input type="checkbox"/> A petition has been filed for this unsigned inventor	
Given Name (first and middle [if any])		Family Name or Surname	
Inventor's Signature			Date
Residence: City		State	Country Citizenship
Mailing Address			
Mailing Address			
City		State	ZIP Country

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